

Attorney Docket No. 25771-X

THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

ZILBERMAN, Uri

Group Art Unit: 3732

Serial No. 10/685,803

Examiner: BUMGARNER, Melba N.

Filed: October 16, 2003

For: DENTAL CROWNS

TRANSMITTAL LETTER

Commissioner of Patents  
P.O. Box 1450  
Alexandria, Va 22313-1450

Sir:

Submitted herewith for filing in the U.S. Patent and Trademark Office is the following:

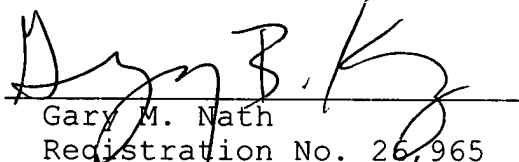
- (1) Transmittal Letter;
- (2) Request for Priority;
- (3) Priority Document No. IL 1426571.

The Commissioner is hereby authorized to charge any deficiency or credit any excess to Deposit Account No. 14-0112.

Respectfully submitted,

**NATH & ASSOCIATES PLLC**

By:

  
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Registration No. 45,273  
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Date: Jan 31, 2005  
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GMN/GBK/ng/Priority\_TRAN



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REQUEST FOR PRIORITY UNDER 35 U.S.C. §119

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In the matter of the above-captioned application, notice is hereby given that the Applicant claims as priority date 17 APRIL 2001, the filing date of the corresponding application filed in ISRAEL, bearing Application Number IL 1426571.

A Certified Copy of the corresponding application is submitted herewith.

Respectfully submitted,  
**NATH & ASSOCIATES PLLC**

Date: January 31, 2005

By: [Signature]

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מדינת ישראל  
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לשכת הפטנטים

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הרשומים בעמוד הראשון  
של הנספח.

CERTIFIED COPY OF  
PRIORITY DOCUMENT

This 2.0-04-2304 היום

לשר  
על הכותמים

רשם הפטנטים

Commissioner of Patents

נתאשר  
Certified

לשימוש הלשכה  
For Office Use

חוק הפטנטים, התשכ"ז - 1967  
PATENTS LAW, 5727-1967

## בקשה לפטנט

Application for Patent

C:41328

אני, (שם המבקש, מעט -- ולגבי גוף מאוגד -- מקום התאגדותו)

I (Name and address of applicant, and, in case of body corporate-place of incorporation)

מספר: Number	2657
תאריך: Date	17-04-2001
הוקדם/נדחה Ante/Post-dates	

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Inventor: URI L. ZILBERMAN

הממציא: אורי ל. זילברמן

By Law  
שמה הוא  
Owner, by virtue of

בעל אמצאה מכח הדין  
of an invention, the title of which is:

כתרים לילדים משרף אציטאלי

(בעברית)  
(Hebrew)

ACETAL RESIN CROWNS FOR CHILDREN

(באנגלית)  
(English)

מבקש בזאת כי ינתן לי עליה פטנט

hereby apply for a patent to be granted to me in respect thereof

* בקשה חלוקה - Application for Division		* בקשת פטנט מוסף - Application for Patent of Addition		* דרישה דין קדימה Priority Claim	
מבקשת פטנט from Application	מס. _____ dated _____	* לבקשה/לפטנט to Patent/Appi.	מס. _____ dated _____	מספר סימן Number/Mark	תאריך Date
רצוף בזה / עוד יוגש - * יפוי כח: כללי/מיוחד P.O.A.: general / individual - attached / to be filed later - הוגש בענין _____ filed in case _____		המען למסירת הודעות ומסמכים בישראל Address for Service in Israel Sanford T. Colb & Co. P.O.B. 2273 Rehovot 76122			
חתימת המבקש Signature of Applicant		חתימת המבקש Signature of Applicant		היום 17 בחודש April שנת 2001 This of the year	
For the Applicant, Sanford T. Colb & Co. C:41328				לשימוש הלשכה For Office Use	

טופס זה, כשהוא מוטבע בראשם לשכת הפטנטים ומושלם בספר ובתאריך ההגשה, הינו אישור להגשת הבקשה שפרטיה רשומים לעיל.  
This form, impressed with the Seal of the Patent Office and indicating the number and date of filing, certifies the filing of the application.  
the particulars of which are set out above.

\* מחק את המיותר Delete whatever is inapplicable

כתרים לילדים משרף אציטאלי

ACETAL RESIN CROWNS FOR CHILDREN

URI L. ZILBERMAN  
CLASSIC DENTAL LAB. LTD.

Inventor: URI L. ZILBERMAN

אורי ל. זילברמן  
מעבדת שניים טיפוסית בע"מ

הממציא: אורי ל. זילברמן

#### FIELD OF THE INVENTION

The present invention relates to tooth prostheses generally and more particularly to crowns.

#### BACKGROUND OF THE INVENTION

The following U.S. Patents and publications are believed to represent the current state of the art: 4,129,946; 5,552,390; 5,487,663; 5,624,261; 5,709,548; 6,106,295;

#### SUMMARY OF THE INVENTION

The present invention seeks to provide a mass-produced, tooth colored pre-fabricated crown, particularly useful in pediatric dentistry for treatment of primary teeth and permanent molars having extensive carious lesions.

There is thus provided in accordance with a preferred embodiment of the present invention an injection molded dental crown formed of an acetal homopolymer.

In accordance with a preferred embodiment of the present invention, the injection molded dental crown is formed with depending side surfaces at least one of which defines an undercut.

Preferably, the depending side surfaces are flexible.

There is also provided in accordance with a preferred

embodiment of the present invention a method for mass producing dental crowns comprising: providing a multi-element mold, employing the multi-element mold to injection mold the crown including depending side surfaces, at least one of which defines an undercut.

In accordance with a preferred embodiment of the present invention, the multi-element mode includes an ejector which is operative to eject the molded crown following opening of the multi-element mold.

## BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description, taken in conjunction with the drawings in which:

Fig. 1 is a simplified pictorial illustration of a dental crown formed of acetal homopolymer;

Fig. 2 is a sectional illustration of the dental crown of Fig. 1, taken along lines II - II in Fig. 1; and

Figs. 3A, 3B and 3C are each simplified pictorial illustrations of apparatus for manufacturing a dental crown from acetal homopolymer resin in accordance with a preferred embodiment of the present invention in three operative orientations.



## DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Reference is now made to Fig. 1, which is a simplified pictorial illustration of a dental crown formed of acetal homopolymer resin and to Fig. 2, which is a sectional illustration of the dental crown of Fig. 1, taken along lines II - II in Fig. 1.

As seen in Figs. 1 and 2, there is provided in accordance with a preferred embodiment of the present invention an injection molded dental crown 10 formed of an acetal homopolymer resin. A preferred material for the crown is DELRIN R which is commercially available from DuPont.

As can be readily seen in Figs. 1 and 2, the dental crown 10 is formed with a generally conventionally tooth shaped top surface 12 and depending side surfaces 14 at least one of which defines an undercut 16. Preferably, the depending side surfaces 14 are flexible. Crown 10 may readily be mounted, by conventional methods, such as through the use of dental cement in the mouth of a patient, typically a child, as part of treatment of primary teeth and permanent molars having extensive carious lesions. It is a particular feature of the invention that crown 10 is of a color which generally matches of the patient's teeth.

The crown of the present invention is characterized by high tensile strength, high impact resistance and stiffness, excellent fatigue endurance and resistance to moisture, excellent dimensional stability and sufficient resilience and resistance to creep. It has the natural appearance of a vital tooth

Reference is now made to Figs. 3A, 3B and 3C, which are

each simplified pictorial illustrations of apparatus for manufacturing a dental crown from acetal homopolymer resin in accordance with a preferred embodiment of the present invention in three operative orientations.

As seen in Figs. 3A, 3B and 3C, the crown 10 is molded in a mold cavity 20 which is defined by a top mold element 22, a bottom mold element 24 and an ejector 26.

Fig. 3A shows the stage of molding when the top mold element 22 lies in tight engagement with the bottom mold element 24 and the ejector 26.

Fig. 3B shows an initial release stage wherein the top mold element 22 is separated from the bottom mold element 24, thus permitting removal of the molded crown 10 from cavity 20.

Fig. 3C shows an ejection stage wherein ejector 26, driven by a piston 28 moves upwardly relative to bottom mold element 24 and pushes crown 10 out of cavity 20. Due to the resilience of the depending side surfaces 14, the action of the ejector is able to disengage from the crown 10 notwithstanding the presence of undercut 16.

It will be appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and described hereinabove. Rather the scope of the present invention includes both combinations and subcombinations of the various features described hereinabove as well as variations and modifications which would occur to persons skilled in the art upon reading the specification and which are not in the prior art.

## C L A I M S

1. An injection molded dental crown formed of an acetal homopolymer resin.

2. An injection molded dental crown according to claim 1 and wherein said acetal homopolymer resin comprises Polioxymethylene (POM) Thermoplastic Homopolymer.

3. An injection molded dental crown according to either of the preceding claims and being formed with depending side surfaces.

4. An injection molded dental crown according to claim 3 and wherein at least one of said depending side surfaces defines an undercut.

5. An injection molded dental crown according to either of the preceding claims 3 and 4 and wherein said depending side surfaces are flexible.

6. A method for mass producing dental crowns comprising:  
providing a multi-element mold; and  
employing the multi-element mold to injection mold a dental crown from an acetal homopolymer resin.

7. A method according to claim 6 and wherein said multi-element mode includes an ejector, said method also comprising

operating said ejector to eject the molded crown following opening of the multi-element mold.

8. A method according to claim 6 or claim 7 and wherein said acetal homopolymer resin comprises Polioxymethylene (POM) Thermoplastic Homopolymer.

9. A method according to any of the preceding claims 6 - 8 and wherein said employing step includes forming said dental crown with depending side surfaces.

10. A method according to claim 9 and wherein at least one of said depending side surfaces defines an undercut.

11. A method according to either of the preceding claims 9 and 10 and wherein said depending side surfaces are flexible.


12. A dental crown according to any of claims 1 - 5, substantially as shown and described hereinabove.

13. A dental crown according to any of claims 1 - 5, substantially as illustrated in any of the drawings.

14. A method according to any of claims 6 - 11, substantially as shown and described hereinabove.

15. A method according to any of claims 6 - 11, substantially as illustrated in any of the drawings.

For the Applicant,



Sanford T. Colb & Co.  
Advocates & Patent Attorneys  
C: 41328 HB-0401

FIG. 1

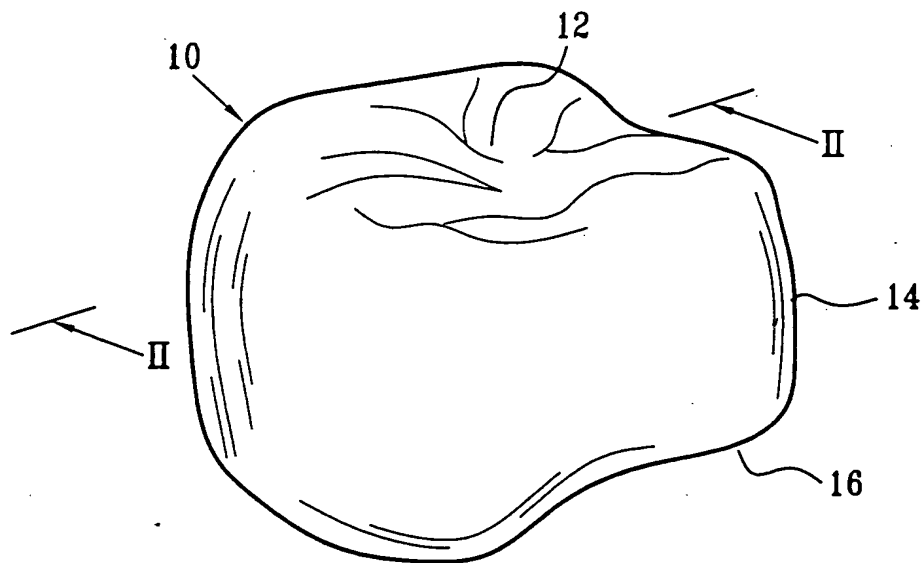


FIG. 2

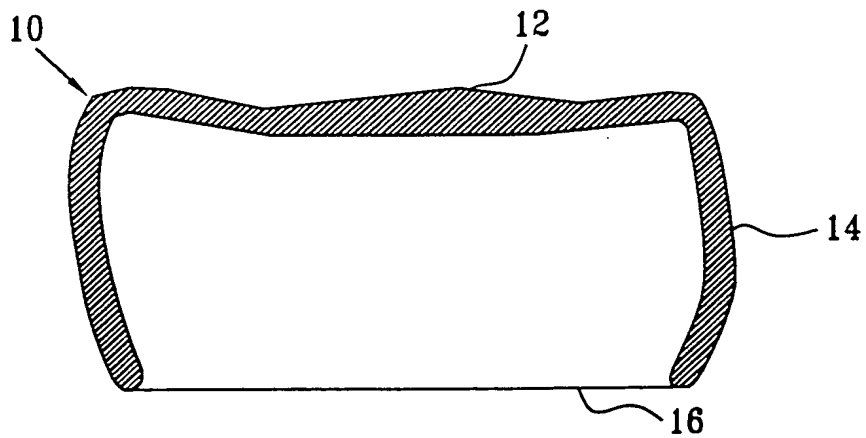


FIG. 3A

